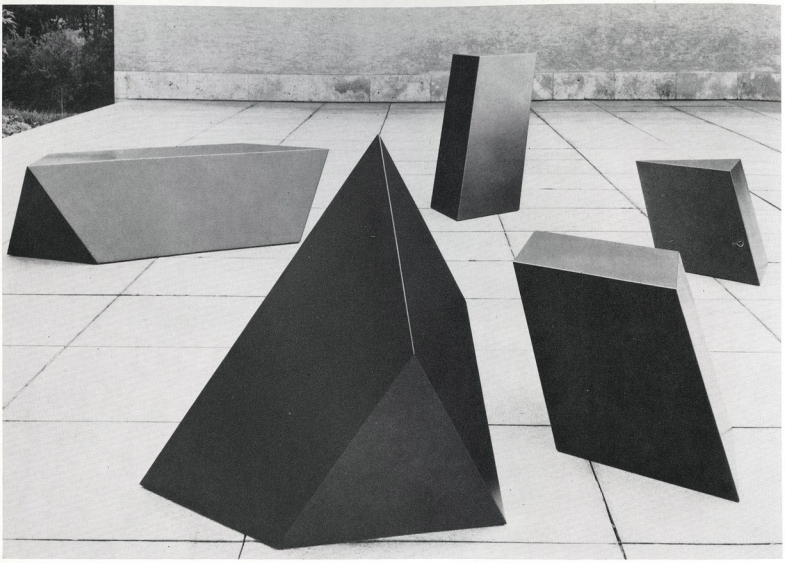
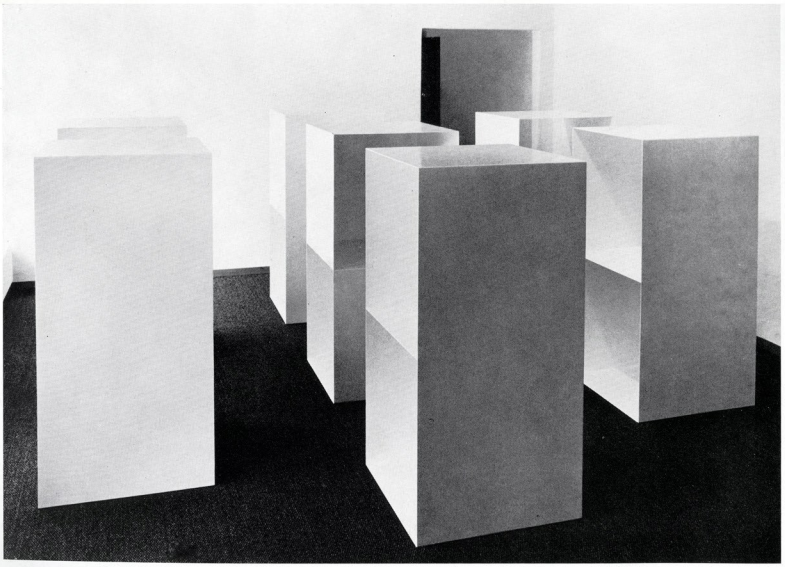


Tony Smith. *Wandering Rocks*, 1967. By courtesy of the Galerie Müller, Stuttgart

Sol LeWitt. *7 two-part variations on 2 different kinds of cubes*. By courtesy of the Galerie Bischofberger, Zürich



TONY SMITH AND SOL LEWITT: MUTATIONS AND PERMUTATIONS

JOHN N. CHANDLER

"Wallas examines all the machines. Each of them contains—placed on a series of glass trays, equidistant and superimposed—a column of earthenware plates with precisely the same culinary preparation on each one reproduced down to the last lettuce leaf. When a column is emptied, anonymous hands fill up the blanks from behind. Having reached the last dispenser, Wallas has not yet made up his mind. Besides, his selection is of slight importance, for the various dishes differ only by the arrangement of articles on the plate; the basic element is marinated herring."[1]

The more things change, the more they remain the same; the more things remain the same, the more significant is the change. A number of recent works of art are like automat lunches where taste plays an unimportant role. A single work contains many pieces each of which contains the same or very similar elements arranged in different orders. The use of modules and interchangeable parts to make variable configurations may reflect the current scientific view of the modular cosmos as well as the mass production for the masses of contemporary technology. Artists with attitudes as different as Carl Andre, Mel Bochner, Eva Hesse, Ursula Meyer and Alejandro Puente are involved with variable arrangements of modular parts. Two recent sculpture exhibitions on different floors of 29 West 57th Street illustrate how artists of almost contradictory intentions are both involved with multipartite projects where the parts differ in order rather than in degree.

Tony Smith's *Wandering Rocks* and Sol LeWitt's *47 Three-Part Variations on 3 Different Kinds of Cubes* are the results of diametrical attitudes about art, but like opposite, alternate angles, though their orientation is different they are in other ways equal. The titles are the first clue to their differences. Smith gives his pieces names *(Smohawk, Crocus, Slide, Dud* and *Shaft)* as though once made they have their own identities with a familial relationship to each other. LeWitt rejects "titles" for their aristocratic pretentiousness while at the same time denying the importance of individualism; he refers to the separate parts by their specifications (2f-2f-3r); he considers the parts as grammatical morphemes of the proposition.

LeWitt refers to his art as a "conceptual art" in which "the idea or concept is the most important aspect of the work". Anything which might detract from the idea, such as great size, he would reject. For him, the idea is the generating function of the product: "The idea is the machine that makes the art." He wants the product to appeal to the viewer's mind rather than his eyes. Smith's art is meant not only for the sensation of the eye but also the other senses; his structures are to be felt or experienced. Smith, like David Hume, has rejected the Cartesian primacy of the reason over the emotions. As Cassirer wrote concerning Hume, "Reason is summoned before the forum of sensation, of pure 'impression', and questioned regarding its claims. And the verdict is that all authority which pure reason had wielded had been unjust and unnatural, in short, had been usurped authority . . . Reason and the imagination have now changed sides in the controversy surrounding the foundations of aesthetics." Smith once said, "I want the thing to appeal directly to the unconscious—don't want people to have to think about it—if they do it is a failure." His view that all science is science fiction is consistent with this Hume-like scepticism.

LeWitt's mechanistic rationalism is also evident in his process of making art. Once the idea has been formulated, whatever follows is out of the hands of the artist. It is unimportant to him if the idea produces something not visually pleasing, visually "illogical". "The work does not have to be rejected if it does not look well." During the process of execution the artist must refrain from making any changes. "Caprice, taste and other whimsies would be eliminated from the making of art." He gives the fabricator the specifications and stays out of the way. Smith, on the other hand, is a delightfully capricious and whimsical artist. Though he too has his finished work fabricated, Smith is very much "at work" during the process of executing models and mock-ups, making radical changes until the piece has a look he likes. *Amaryllis* was the result of stopping after joining together two units which were to have been parts of a much larger piece; *Cigarette* was the result of tearing down a larger, unsatisfactory piece and stopping when arriving at this form. Unlike LeWitt, Smith is very much concerned with how his pieces look, even to the point of determining in what light they should be seen and in what surroundings they should stand. He prefers a leafy background and twilight or dawnlight; LeWitt has a contempt for trees and nature and thinks of space as cubic volumes or rooms and light as wattage or Dwanlight.

LeWitt is concerned with playing down the physicality and materiality of the work; consistent with his opinions of art as idea, he feels that the physical production of the work is perfunctory, something expected to be performed but actually unnecessary once the idea has been adequately expressed in sketches, drawings and models. "The physicality of a three-dimensional object becomes a contradiction to its non-emotive intent . . . Anything that calls attention to and interests the viewer in this physicality is a deterrant to our understanding of the idea and is used as an expressive device. The conceptual artist would want to ameliorate this emphasis on materiality." Smith, on the other hand, has emotive intent and his works have a physical presence. Even as a painter, Smith has always been interested in solids and the paced unfolding of surfaces. Though his sculpture is actually hollow, the hollowness has nothing to do with the intention and is not perceived by the viewer. LeWitt reduces the physicality of his work by often making the pieces open; his cubes are often not six-sided cubes but twelve-edged "opens". Smith has also used open forms (his *Smoke* is the best example), but when he does the scale is usually so large that the volumes and surfaces are no less physical, and paradoxically it is LeWitt's rather than Smith's open pieces which present physical barriers to the spectator. This is only an apparent paradox because, consistent with their intentions, LeWitt's work is presented mainly to the viewer's mind, whereas Smith's are presented to his body as well. LeWitt's is cerebral; Smith's is corpuscular. Smith has said that he is not interested so much in the internal relationships as in the silhouette; he wants his works to "loom".

In short, LeWitt's attitude is Apollonian, Smith's Dionysian; LeWitt's work emphasizes clarity, comprehensibility, self-containment, is passive, cool, rational, sober; Smith's emphasizes mystery, inscrutability, expressivness, is active, inflammatory, sensual, exuberant. LeWitt's harmony is consonance: the orderly structure of the whole in terms of the arrangement, progression and modulation of the parts. Smith's harmony, like that of the ancient Greeks, is the tension of opposites, the result of strife; Harmonia was the daughter of Love and War. In Smith's case the conflict is between modular regularity and organic variety; his art is the attempt to force the production of the latter out of the former. The stunning variety of his work is produced by the regular repetition of two regular solids. As a result of this agon and its resolution Smith's works are dramatic.

Michael Fried has focused on just this dramatic quality in his blanket condemnation of most good contemporary sculpture. He has not only attributed to the whole what is true of the part but has made much of the fallacy of the converted middle. Having established that Smith's work is dramatic, he proceeds to refer to it as theatrical, a word whose connotations better fit Fried's style than Smith's. Fried thinks that theatre is the "negation of art", and that there is "a need to defeat theatre", which he equates with a need to defeat *time*. This is a dramatic proposal—a cry to raise the colors and ride out and spray the fiery dragon. His windmills are clocks. Nevertheless, the universe is, as Buckminster Fuller has said, a "nonsimultaneous configuration of events", and in spite of the promise of timelessness in the world of the dead, most contemporaries, in science, music, poetry, drama, prose, dance, film-making and sculpture are concerned with what George Kubler has called "the shape of time". But to say that everything has a time dimension is not to say that it is therefore dramatic (and certainly not theatrical). LeWitt's work can be seen as time exposures which register the transformation of the pieces in his series, but LeWitt's work is no more dramatic than a Greyhound Bus timetable. Neither the presence nor the absence of the dramatic in art is any guarantee of quality.

It is partly in their shared concern with time configurations that both Smith and LeWitt, in spite of their differences (which neither of them makes into a dogma or manifesto) belong to the present. They also have in common a prevalent awareness of a continuous three-dimensional space grid, or web, in which three-dimensional objects exist. LeWitt's grid is made of the Cartesian 90-degree coordinates, whereas Smith, who used to work in a right-angled framework, switched to a 60-degree space frame based on the tetrahedron which he discovered gave him a greater degree of flexibility and visual continuity. Smith

said, "We think in two dimensions—horizontally and vertically. Any angle off that is very hard to remember. For that reason I make models—drawings would be impossible." In analyzing Smith's work I have found it imperative to make models of his pieces; it is only by doing this that I have been able to detect their underlying structure. On the other hand, LeWitt's right-angled pieces are easily visualized when they are described; since their appeal is directly to the mind, this is appropriate.

Tony Smith's recent sculpture uses basic crystal modules, tetrahedra and octahedra, ordered and arranged in structures which, though appearing asymmetrical and disordered, are often surprisingly symmetrical (though not bilaterally) when the hidden structural patterns are discovered. Though they have a sense of wholeness, they defy the powers of the visual imagination when seen from only one angle. If one looks at them from one position and then moves only a few feet, "*certain outlines are emphasized, others are blurred; here and there distances open out, unexpected masses appear; the whole view is organized into a series of planes silhouetted against one another, so that the depth, suddenly illuminated, seems to lose its natural look—and perhaps its reality—as if this overexactitude were possible only in painting. Distances are so affected that they become virtually unrecognizable, without it being possible to say in just what way they are being transformed: extended or telescoped—or both at once—unless they have acquired a new quality that has more to do with geometry . . .*"

Some of Smith's pieces have been so symmetrical that they can reproduce themselves by rotation, just as an equilateral triangle reproduces itself when rotated 120 degrees. Based on a continuous space grid, itself generated by the rotation of the basic modules, these structures can be seen as holes punched in a solid space constructed of these modules. Although a plane can be completely filled with equilateral triangles, three-dimensional space cannot be filled with tetrahedra alone, but requires the alternation of tetrahedra with octahedra. Though it might seem that sculpture made of only these two modules would have a limited number of possibilities, this is not at all the case, as Smith has already demonstrated; in fact, it is hard to visualize any limitation to the forms which can be made from this simple generating function.

Once the pattern is begun, the only choices remaining to Smith are when to change direction and when to stop. The piece almost makes itself, just as crystals form when a solution has become fixed. Even the changes of direction are limited to 60 degrees and 120 degrees. Another self-imposed limitation of this method is that all the surfaces will be parallel to the sides of the initial octahedron, though they may be in different planes. Except for one early piece (never exhibited) in which Smith used tetrahedra joined face to face to form a helix whose components rotate around a central imaginary straight line, all of his tetrahedral sculpture is cubically closest-packed. (In cubically closest-packed crystals the tetrahedra join only at their edges, so that if something is to be added to a tetrahedron's face it has to be an octahedron.)

These tetrahedra and octahedra are indiscernable in the finished work; no line shows where the elements are joined; a continuous ribbon of surface covers up all tracks so that the piece is seen as "*not a series of irrational, unrelated images, but a smooth band where each element immediately takes its place in the web, even the most fortuitous, even those that might at first seem absurd or threatening or anachronistic or deceptive; they all fall into place in good order, one beside the other, and the ribbon extends without flaw or excess, in time with the regular speed of footsteps*". This is as true of a piece like *Cigarette*, where the parts are contiguous, as it is of *The Wandering Rocks*, where they are discontinuous and their relations are variable.

Smohawk is the basic composite module of all of Smith's tetrahedral sculpture—an octahedron with an adjacent tetrahedron. This conjunction forms a new seven-sided figure with four equilateral triangular faces and three rhombi, one of which is the base. As simple as this piece is, it has the visual complexity of the larger pieces, taking on a different appearance with each different point from which it is viewed. Even more radical changes in appearance would result by rotating the piece on its axis so that the tetrahedron, normally upright, is either inverted or transposed to the top of the octahedron. *Crocus* is actually *Smohawk* with an additional tetrahedron on top, producing a six-sided solid with two triangular, two rhomboidal, and two trapezoidal faces. *Slide* has exactly the same components as *Crocus*, but they are arranged differently; the tetrahedron is removed from the top and placed on the octahedron's face, parallel to and opposite the face where the first tetrahedron is joined. The solid thus made has six identical rhombic sides; a triclinic parallelepiped, it resembles a leaning cube, and like a cube it reproduces itself by rotation. *Shaft* is *Slide* with *Smohawk* sitting on top (or it is *Crocus* with *Smohawk* attached to its visible rhombus face). *Shaft* is a seven-sided solid with two trapezoids, two parallelograms, two triangles and a rhombus base; though it has a very vertical look, it is actually longer than it is tall. If *Shaft* were laid on one of its parallelogram sides and *Smohawk* were added to it, *Dud* would result. *Dud* can also be seen as a *Slide* with a *Smohawk* on each end (one upright and one inverted), or as a *Crocus* similarly flanked by *Smohawks*. Thus all five *Wandering Rocks* relate in a nonhierarchical progression as well as structurally.

The *Rocks* are smaller than Smith's typical work. It is as though some cataclysmic event shattered a larger piece and produced these fragments which, like broken crystals, have retained necessarily a resemblance to the former piece. The viewer can pass between them causing them to change their appearance and their interrelations, or he can return on another day and find them, like shells on a beach, rearranged by the droll tides. Fabricated from steel, their finish is ambiguous. They can be seen as industrial, like cast metal, or as rocks, their former blackness greyed and greened with lichen.

LeWitt has used the cube as his basic element; each piece is the result of stacking three cubes. Three variations of the cube are used: one a solid or six-sided, one a five-sided box open at one vertical side, and one a four-sided sleeve open at opposite vertical sides. "*Here there is only what is strictly necessary: regular walls pierced with rectangular openings; it does not suggest poverty, only work and economy.*" Each piece uses a different combination of these elements; for example, one is three solids and another is two boxes and a solid. The placement of these elements also varies; in the combination of two boxes and a sleeve, the sleeve could be at the top or in the middle. Rotation produces further variations and further rotation eliminates others. Rotation on the vertical axis either of a single cube or a pair produces new variations. For example, the piece with the sleeve on top of two boxes could have all the openings face east, or the two box openings could face east and the sleeve openings north and south; the sleeve east and west and the boxes north, or one box south and the other west, etc. Such a scheme, if carried through, would produce a fantastic number of variations.

LeWitt has used a visual criterion to limit the number: if the rotation would result in a form visually (or tactilely) identical to one already produced, then it is not made. LeWitt sees this as a means of eliminating redundancy, but actually it is visual redundancy since conceptually the initial piece made of three solid cubes is not the same piece which would result by rotating its top cube. Visually they are redundant since the eye (or the touch) could not distinguish between them, but the mind, to which it is LeWitt's intention to appeal, can tell the difference. Nevertheless, this principle limits the number of pieces to 47, a large but manageable number. LeWitt, who prefers closed systems to open or infinite ones, has programmed into his formula the requirement to reject duplicates. Since his space, like absolute space, has no left or right, front or back, up or down, any piece which by any manipulation would generate an identical piece is rejected. This includes rotating the piece on its horizontal axis; for example, it might seem that the piece with the sleeve on top of two boxes would be a different piece than the one with the two boxes on top of a sleeve, but if this piece is turned upside down it is discovered that they are identical.

LeWitt has no mathematical formula for determining which pieces to make and which to reject, nor formula to tell him in advance how many pieces the system would generate. Unable to afford a computer, he worked this all out empirically while making the models. In fact, at the last moment, after the posters describing the show had been made, LeWitt discovered that by some confusion that had occurred when placing his order, one of the possible pieces had not been made. He called his fabricator, who understood his code of specifications, and ordered the missing piece. For a recent show at the Galerie Bischofberger in Zurich he showed a variation on these variations; using only the open cubes without the solids; the total number of pieces in that series worked out to seven.

Originally LeWitt planned to arrange these variations on a grid as he did his last major work. But he found the grid too confining, too tight, for this project. The 47 pieces don't arrange themselves very neatly on a square grid; there would have been a gap somewhere, a line of disorder in the midst of order. So he divided the grid into runways or rows with intervals between them. The pieces are arranged in these rows with the intervals between the pieces in a row equal in size to the

bases of the pieces. "*The row is broken only at the perpendicular, identical crossroads.*" "Regular space might also become a metric time element, a kind of regular beat or pulse. When the interval is kept regular whatever is irregular gains more importance", LeWitt has written.

The 47 varieties are arranged in groups or families: a set where the solids predominate contains five pieces, there are six in the set which has one of each kind of cube, the group in which the sleeves predominate contains fourteen variations and the box set has 22 representatives. The intervals between the groups is double the width of the base of the basic cube. Once having abandoned the presuppositions of previous work, LeWitt found the peculiar order inherent in the present work. This is not so much a rejection of his principle that once the idea is arrived at the artist should not make changes in the process of execution as it is the result of letting the idea have its head to determine its own arrangements, free from the artist's presuppositions. Or is it?

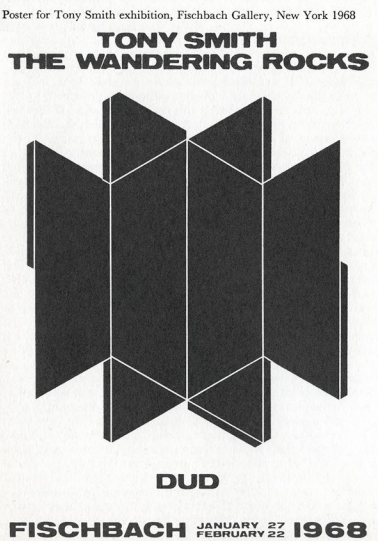
The current concern of artists with "systems" recalls the rejection of systems by the eighteenth-century *philosophes*. The seventeenth-century philosophers, following the model of Euclid's *Elements*, constructed elaborate systems, long chains of deductive reasoning where every link depended upon all those which preceded it and upon which all further links depended. The eighteenth century, following the lead of Newton and natural philosophy, rejected this kind of deduction and rejected *a priori* systems. Rather than beginning with principles and arriving at particulars, the process was reversed. Knowledge became more elastic, open-ended and concrete. Since then, attempts to make systems have been negligible, and when they have been formulated, they have been useless. The formulator of a system of aesthetics has nothing to say to working artists because he has not observed the relevant phenomena —in this case contemporary works of art. Nevertheless, some of the most beautiful of human productions have been these philosophical systems. What is more beautiful than the systems of Aquinas, Spinoza, Hobbes and Descartes? Every part in its appropriate place, deduced from those prior and antecedent to those that follow, the whole being an attempt to reduce the apparent variety to unity. Even their uselessness enhances their aesthetic quality, just as a ruined Gothic cathedral is perhaps more a work of art now than it was when it was functional. Although systems are useless for philosophy and science, their inherent adaptability to art must now be evident. It is perhaps in art that systems have found their proper domain. Not all art should be systematic, but all systems are art.

A distinction should be made between "system" and "method". Newton's "Rules for Philosophizing" was a method, but one who followed Descartes' *Discourse on Method* would probably create a system. Schoenberg's twelve-tone technique is a method, not a system. A method is a means of obtaining an end and never an end in itself; a system is both a means and an end. D'Alembert, Condillac and other *philosophes* distinguished between *esprit systématique*, which valued methodological order, and *esprit de système*, the love of system for its own sake. There are different ways by which parts may be arranged in different ways, and they correspond to the *philosophes*' distinction: Smith's is the *esprit systématique* and LeWitt's the *esprit de système*.

"*Things take their immutable course. With calculated movements.*"

1. All italicized quotations are from Richard Howard's translation of Robbe-Grillet's *The Erasers*, Grove Press, 1964.

Poster for Tony Smith exhibition, Fischbach Gallery, New York 1968



Sol LeWitt. Schematic drawing for *47 three-part variations on three different kinds of cubes*